

Bereskin & Parr

INTELLECTUAL PROPERTY LAW

Appl. No. : 10/786,042 Confirmation No.: 2918
Applicant : COTE et al.
Filed : February 26, 2004
Title : POTTING METHOD FOR MEMBRANE MODULE
TC./A.U. : 1723
Examiner : MENON, Krishnan S.
Docket No. : 4320-556
Customer No. : 001059

Board of Patent Appeals and Interferences
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450

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BRIEF IN SUPPORT OF APPEAL

Real Party in Interest

The Real Party in Interest in the present Appeal is Zenon Technology Partnership, the assignee. Zenon Technology Partnership is a partnership related to 1244734 Alberta ULC, GE Betz Canada Company, GE Betzdorborn Canada Company, GE Betz Inc., MRA Investments Inc., MRA Systems Inc., GE Investments Inc. and General Electric Company. Other companies may have a non-controlling interest in one or more of these companies.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of the Claims

Claims 1-36 have been cancelled. Claim 37 stands allowed. Claims 38 and 39 stand finally rejected by the Examiner as noted in the Advisory Action mailed March 9, 2007. The rejection of claims 38 and 39 is appealed.

Status of Amendments

Applicant's amendment dated February 19, 2007, submitted after the Examiner's Final Rejection, has been entered by the Examiner on or before the mail date of the Advisory Action (March 9, 2007).

Summary of the Claimed Subject Matter

The Applicants' invention generally relates to a header for a water treatment module, the header comprising a shell with hollow fiber membranes potted therein (see, for example, references to "module 90", "headers 100", and "hollow fiber membranes 104" at page 5, lines 13-15, with reference to Figure 1; and "shell 106" at page 5, lines 24-25, with reference to Figure 3).

Claim 38 recites a header comprising a shell having an outer surface and an inner surface defining at least one potting recess (see, for example, reference to "inner surface 118", "outer surface 120", and "recess 116" at page 5, lines 28 – page 6, line 2, with reference to Figures 3 and 4).

Claim 38 (at par. b) further recites a block of resin in the potting recess of the shell, the block of resin having ends of hollow fiber membranes posted therein (see, for example, reference to "potting resin 162" at page 8, line 13, with reference to Figure 6c).

Claim 38 (at par. c) further recites at least one resin injection duct extending between the outer surface of the shell and the potting recess, the at least one resin injection duct having an inlet open to the outer surface and an outlet plugged by the block of resin, wherein the resin injection duct passes through the shell and comprises a bore through the shell. One example of an "injection duct 126" is described at page 6, lines 20-22, having an "inlet port 130" open to the outer surface 120 of the shell 106, and a "discharge outlet 132" in the interior of the recess 116. The ducts 126 being plugged by the resin 162 is described, for example, at page 9, lines 15-17. Other examples of injection ducts include "injection ducts 226a", having outlets 232a, as described, for example, at page 11, lines 1-8. The outlets 232a are shown plugged by resin 262, for

example, in Figure 9. At page 11, lines 21-22, other examples of injection ducts are described, including injection ducts provided "through the sidewalls of the header shell".

Claim 38 (at par. d) further recites a permeate collection cavity between the block of resin and a portion of the inner surface of the shell, the hollow fiber membranes having lumens in fluid communication with the permeate collection cavity. An example of a "permeate collection cavity 161" is described at page 9, lines 14-15, and is illustrated, for example, at Figure 6c.

Claim 39 is similarly directed to a header for a water treatment module comprising a shell, a block of resin, at least one resin injection duct, and a permeate collection cavity. The shell of claim 39 is defined as having a base and spaced apart sidewalls, examples of which include "base 108", "sidewalls 110" (page 5, lines 26-27). The block of resin of claim 39 is defined as abutting the sidewalls, an example of which is illustrated in Figure 6c, where the block of resin 162 abuts sidewalls 110 (not labeled in Fig. 6c, but see Fig. 4).

Grounds of Rejection to be Reviewed on Appeal

Claims 38 and 39 were rejected as anticipated by Dannenmaier et al. (WO00/44478; U.S. 6,951,611). This rejection was first made in the "Final" Office Action mailed January 18, 2007 (at pg. 3, par. 4), based on new dependent claims 38 and 39 submitted prior thereto, and affirmed in the Advisory Action (based on claim 38 and 39 in their present, independent form). The s.102(b) rejections of claims 38 and 39 based solely on the Dannenmaier reference are the only rejections of claims 38 and 39. Review of these rejections is sought by this appeal.

ARGUMENTS

S.102(b) Rejection of Claims 38-39 in View of Dannenmaier et al. (WO00/44478)

Examiner's Position

The Examiner stated at pg. 3 of the Final Action that:

"Dannenmaier teaches a header comprising a shell (47, figures 6 and 7),

spaced apart sidewalls (23) , separated by the hinge (27) on one side and the potting conduit (55) on the other side),

resin injection duct (55 with aperture 57 into the shell), the duct and the aperture plugged by the resin (column 9 lines 10-12),

and a permeate collection cavity between the block of potting resin and the shell (47).

The aperture is on the sidewall of the shell as claimed."

In the Advisory Action, the Examiner stated that:

"The structure in figure 7 of the Dannenmaier reference shows a "shell" (47) which has extended sidewalls defined by (23) in figure 6, which after assembly would be (27) in figure 7. The shell (47) with its sidewall (27) are joined by welding (column 8, lines 45-48), thus making them integral in to one shell as in claim 38."

The Examiner further stated that:

"The resin injection duct (53, 57) passes through an opening (or bore) on the shell/sidewall, and is blocked by the resin block.

Claim 38 Arguments

Applicant submits that Fig. 7 of Dannenmaier discloses a filter having a generally cylindrical housing 13 with end caps ("terminating parts" 47) separately attached at either end.

Before considering what is disclosed by the assembly in Fig. 7, the housing 13 and end caps 47 will (for thoroughness) first be considered separately.

The housing 13 fails to anticipate claim 38 for a number of reasons, including that it fails to disclose a header for a water treatment module, and it fails to disclose a permeate collection cavity between the block of resin and a portion of the inner surface of the shell as claimed in claim 38.

The end caps 47 are, Applicant submits, the elements in Dannenmaier most closely related to the claimed subject matter, in that a person skilled in the art would recognize

that the end caps 47 of Dannenmaier most closely correspond to the header for a water treatment module of claim 38, under circumstances where claim 38 is given a broadest reasonable interpretation consistent with the specification. Applicant acknowledges that the end caps 47 include some of the elements of claim 38, for example, a shell having an outer surface and an inner surface, and providing space for a permeate collection therein. However, the end caps 47 fail to include other elements of claim 38, such as, for example, at least one resin injection duct.

It is the Examiner's contention that the combination of the housing 13 with attached end caps 47 (as illustrated in Fig. 7) anticipates claim 38. Applicant submits that claim 38 cannot properly be held anticipated by Dannenmaier's filter assembly of Fig. 7 for at least the three reasons set out as follows:

- (i) The combined structure of Fig. 7 does not disclose a shell for a header for a water treatment module as recited in claim 38. Fig. 7 shows a fully assembled filter having hollow fibers encased in a housing with separately attached end caps affixed at either end. The Examiner appears to acknowledge that any element alone or combination of elements (each as a complete element as disclosed) in the structure of Fig. 7 fails to disclose the shell of claim 38, but appears to suggest that an end cap 47 combined with a portion of the housing 13 (comprising portions 21, 23) discloses such a shell. In particular, at page 2 of the Advisory Action, the Examiner stated: "The structure of Fig. 7 of the Dannenmaier reference shows a "shell" (47) which has extended sidewalls defined by (23) in Fig. 6, which after assembly would be (27) [sic – presumably 21] in Fig. 7. The shell 47 with its sidewall (27) are joined by welding (column 8, lines 45-48) thus making them integral in to one shell as in claim 38."

Applicant submits that combining the end caps 47 with only an axially outermost portion of the housing 13 (e.g. so that an axially central portion of the assembly in Fig. 7 has no outer casing), and to thereby find a "shell" for a header module as claimed in claim 8 is impermissible, because it destroys a key feature of the structure of Fig. 7 (namely, the potting inlet 53 and

channels 55 provided in the central portion of the housing 13). Applicant submits that the structure of Fig. 7 of Dannenmaier fails to disclose a shell for a header module as claimed in claim 38, and accordingly fails to anticipate claim 38.

- (ii) The Examiner has made assumptions and conclusions regarding the combined structure of Fig. 7 that are not supported by the reference. For example, Dannenmaier does not teach that the end caps 47 are attached to the housing 13 of Fig. 6, without altering the housing 13 prior to such attachment. In Fig. 6, the housing 13 is shown in an open state, with the first half 21 and second half 23 oriented in uncovered, side-by-side relation. No hollow fibers and no block or blocks of potting resin are shown in Fig. 6. Furthermore, no permeate collection cavity, nor its position in relation to the resin, shell, or fibers, is shown in Fig. 6. In Fig. 7, only the outer surface of an assembled filter unit is visible. Again, no hollow fibers, no block or blocks of potting resin, and no permeate collection cavity (particularly in relation to other elements) are shown.

Dannenmaier mentions closing of the housing portions 21, 23, and pouring potting compound into aperture 53 to pot hollow fiber ends in the filter housing 13 (pg. 12, lines 14-20). Dannenmaier also teaches that after potting, the potted fiber ends are cut so that the hollow fibers terminate with open ends (pg. 4, lines 11-12).

It is clear that significant steps are required to take the housing 13 of Fig. 6 and form the completed filter assembly of Fig. 7. At least some of these steps must have direct impact on the relative location of a potting recess, a block of resin, and an outlet of an injection duct, if in fact each of these elements are present at all in the structure of Fig. 7. Pertinent details are simply not provided in the Dannenmaier reference.

Despite these omissions, the Examiner has concluded that "there is a one-to-one correspondence of the recited structural elements and there (sic) relationship as claimed to the structure presented in the particular

embodiment of the reference" (Advisory Action, page 3). Applicant respectfully submits that this conclusion is not adequately supported by the reference to sustain this rejection.

- (iii) Applicant submits that in accordance with the teaching in Dannenmaier, the filter assembly disclosed in Fig. 7 would not contain all of the claim limitations of claim 38. Dannenmaier teaches that the filter of Fig. 7 is made by placing a hollow fiber bundle 41 in one side (e.g. 21 or 23) of the housing 13. The portions 21, 23 are then closed together and retained in a closed state by clamping means 59, 61 (see pg. 12, lines 1-13; pg. 11, lines 3-12).

The ends of the fibers are then potted in the housing 13, by pouring a potting compound into aperture 53, through channel 55, and out the outlet 57. The potting can be assisted by rotating the housing 13 (pg. 12, lines 20-23), presumably about a transverse axis.

Applicant submits that one skilled in the art would readily recognize that for the potting compound to actually pot the fiber ends, the opposing axial ends of the housing 13 must be plugged (otherwise the compound would simply leak out between adjacent fibers, without forming a block of resin, and without reaching particularly the radially innermost fibers). This is explained in greater detail with reference to Figure A (shown below).

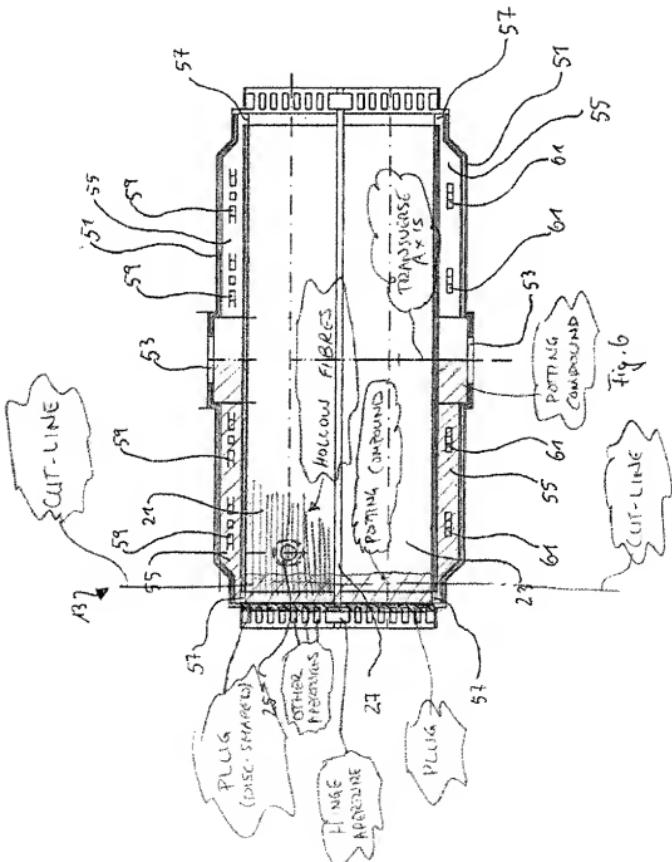


FIGURE A (from FIG. 6 of WO2000/04478)

The plug (shown as a disc in Fig. A) would need to be positioned sufficiently axially inward to block off the hinge aperture and other apertures in the outer ring of the housing 13, and axially outward of the outlets 57 to avoid obstruction thereof. The ends of the fibers would terminate inward of the plug face, likely with some gap to allow the compound to reach the radially inmost fibers of the bundle 41.

Once potting is complete, Dannenmaier teaches that the potted fiber ends are cut so that the hollow fibers terminate with open ends (pg. 4, lines 11-12). Since the fibers are potted in the housing 13, this would require cutting off the ends of the housing 13, at a position axially inward of the fiber ends, and axially outward of the inner face of the hardened potting compound (see proposed cut-line in Fig. A).

As a result, it seems inevitable that the structure surrounding the outlets 57 in Fig. 6 would be absent in the assembly of Fig. 7. Accordingly, the remaining injection channel would fail to have an outlet plugged by the block of resin in which the hollow fibers are potted, which is a limitation of claim 38.

Claim 39 Arguments

Applicant submits that claim 39 was rejected on the same grounds as claim 38, and that the arguments raised regarding claim 38 also apply to claim 39. In addition, Applicant submits that claim 39 specifically recites a header comprising a shell having a base, spaced-apart sidewalls joined to the base, and at least one potting recess between the sidewalls. The shell comprises an inner surface directed towards the potting recess, and an outer surface opposite the inner surface (i.e. facing away from the potting recess). Claim 39 further recites an injection duct extending between this outer surface, and the potting recess. In Dannenmaier, the potting channels 55 have inlets 53 that are positioned on a surface spaced well away from an permeate collection cavity, rather than on a surface opposite the permeate collection cavity as claimed in claim 39.

Summary

For the reasons above, the Appellants believe that the Examiner's rejections of claims 38 and 39 were erroneous and reversal of his decision is respectfully requested.

Respectfully submitted,

COTE et al.

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CLAIMS APPENDIX

38. A header for a water treatment module, comprising:

- a) a shell having an outer surface and an inner surface defining at least one potting recess;
- b) a block of resin in the potting recess of the shell, the block of resin having ends of hollow fiber membranes potted therein;
- c) at least one resin injection duct extending between the outer surface of the shell and the potting recess, the at least one resin injection duct having an inlet open to the outer surface and an outlet plugged by the block of resin, wherein the resin injection duct passes through the shell, and wherein the resin injection duct comprises a bore through the shell; and
- d) a permeate collection cavity between the block of resin and a portion of the inner surface of the shell, the hollow fiber membranes having lumens in fluid communication with the permeate collection cavity.

39. A header for a water treatment module, comprising:

- a) a shell having a base, spaced apart sidewalls joined to the base, at least one potting recess between the sidewalls, an inner surface directed towards the potting recess and an outer surface opposite the inner surface;
- b) a block of resin in the potting recess of the shell and abutting the sidewalls, the block of resin having ends of hollow fiber membranes potted therein;
- c) at least one resin injection duct extending between the outer surface of the shell and the potting recess, the at least one resin injection duct having an inlet open to the outer surface and an outlet plugged by the block of resin, the injection duct passing through the shell; and

- d) a permeate collection cavity between the block of resin and a portion of the inner surface of the shell, the hollow fiber membranes having lumens in fluid communication with the permeate collection cavity.

EVIDENCE APPENDIX

1. NONE

RELATED PROCEEDINGS APPENDIX

1. NONE